CHARACTERIZATION OF KEMP'S RIDLEY SEA TURTLES IN THE FLORIDA BIG BEND AREA DURING 1995 & 1996

FINAL REPORT

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By

Cathi L. Campbell[1,3] & Kenneth J. Sulak[2,3]
Principal Investigators

[1]Department of Wildlife Ecology & Conservation
303 Newins-Ziegler Hall
University of Florida
Gainesville, Florida 32611
(352) 392-4851, FAX (352) 392-6984

[2]Florida Caribbean Science Center
Biological Resources Division, U.S. Geological Survey
7920 NW 71st Street
Gainesville, Florida 32653
(352) 378-8181, FAX (352) 378-4956

[3]Undertaken in collaboration with:
Institute for Fisheries Ecology Research
Florida State University
Tallahassee, Florida

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Introduction

The Kemp's ridley sea turtle (*Lepidochelys kempi*) is the most endangered of the seven extant marine turtle species (Ross et al. 1989). The species nests almost exclusively at Rancho Nuevo, Tamaulipas, Mexico, where nesting populations have declined approximately 98 percent in less than 25 years (Márquez 1984). Fewer than 700 individuals have nested annually in recent years (Ross et al. 1989). Lack of knowledge about early life stages of the Kemp's ridley sea turtle currently hinders recovery efforts for this federally listed species.

In the species recovery plan for the Kemp's ridley (U.S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS), 1992), the recovery team identified in-water, live capture studies as a Priority I Task for recovery of the species to determine seasonal use of nearshore habitat by juvenile/subadults. The U.S. Geological Survey, Biological Resources Division (USGS-BRD) (formerly National Biological Service) has targeted marine turtles on their Biological Resource and Management Issues agenda. In addition, an independent scientific review team (Eckert et al. 1994) has recommended that research efforts for Kemp's ridley be focussed on a large-scale mark and recapture program that should, in part, provide information on growth and survival rates, size-frequency distributions, sex ratios, habitat use, and movement patterns for wild and headstarted juvenile turtles.

Juvenile and subadult Kemp's ridleys are known to utilize the shallow nearshore waters of the north and central West Coast of Florida (Ogren 1989, Rudloe et al. 1991, Schmid and Ogren 1991). In the nearshore waters of Cedar Key, Florida, Schmid and Ogren (1991) have been conducting a long-term study of wild subadult Kemp's ridleys. This is one of few studies that has characterized the population of Kemp's ridleys utilizing developmental habitat in the region. The current study was undertaken as part of a collaborative effort between the NMFS, Southeast Fisheries Science Center, Panama City, Florida, and USGS-BRD, Florida Caribbean Science Center, Gainesville, Florida, to establish sampling methods for development of population indices for monitoring Kemp's ridleys in the Florida Panhandle.

Objectives

The ongoing goals of the NMFS/USGS ridley research in the Florida Big Bend area are to define patterns of occurrence, relative abundance (vis-a-vis other sea turtle species), growth rate, sex ratio, size frequency distribution, habitat use, and movement.

The specific objectives addressed in FYs 1995 and 1996 were as follows:

1. Establish net capture locations for Kemp's ridley turtles in various parts of the Big Bend area.
2. Ground proof and refine capture methodologies.
3. Obtain data on size, relative abundance, and sex ratio.
4. Tag captured individuals for re-identification and subsequent definition of seasonal/annual movements.

FY 1997 objectives will remain the same, with addition of another objective previously unaddressed due to logistic limitation:

5. Tag captured individuals with radio/acoustic transmitters and monitor movements within and between Big Bend area capture sites.

Study Area

The study was conducted from Apalachee Bay to Suwannee Sound of the Florida Big Bend. The specific areas targeted for sampling included Apalachee and adjacent bays, between Dallus Creek and Big Grass Island (near Fisherman's Rest), and the vicinity of Pepperfish Keys (Figure 1). The majority of netting in 1995 was conducted in and around Dickerson and Levy Bays, where as the majority of netting in 1996 was conducted in the other two locations. Much of the Apalachee Bay area can be characterized as estuarine habitat with seagrass or sand/mud substrate with patches of oyster beds throughout. The more southern capture areas are characterized primarily by seagrass beds with sand substrate.

Materials and Methods

Identification of Potential Capture Sites

The study period was primarily from mid-August through October 1995 and May through October 1996. However, data from 26-27 June 1995 are included in this report because the same area was sampled for fish species diversity and abundance using identical sampling methods. A combination of methods were used to determine specific sampling locations for 1995 and 1996 including: a review of the literature of previous sampling efforts (Ogren 1989, Schmid and Ogren 1991, Rudloe et al. 1991), informal interviews of local fishermen, sightings of Kemp's ridleys during scouting trips, and net sampling.

In 1995, net sampling was conducted in: Dickerson Bay, Levy Bay, entrance to Dickerson/Levy Bays (near Fiddler's Point), adjacent to Whetstone Point, and adjacent to the lighthouse in St. Marks National Wildlife Refuge (SMNWR), see Figure 1 inset. In 1996, sampling was more dispersed due to capture methods but included the channel northwest of Pepperfish Keys, the seagrass flats from Horseshoe Beach to just north of Pepperfish Keys, a channel adjacent to Fisherman's Rest, and the seagrass flats from Fisherman's Rest to just north of Big Grass Island.

Capture Techniques

All species of marine turtles were targeted, although our emphasis was on Kemp's ridleys. Turtles were captured using set nets, strike nets, and by hand. Set nets were made of multi-filament nylon and measured 45-60 m total length with 10-25 cm bar, however, we usually used a set net measuring 25 cm bar x 50 m total length. For strike netting, we used either a 25 cm bar x 50 m nylon net, a 10 cm bar x 120 m nylon net, or a 5 cm bar x 125 m monofilament

net. Nets were deployed across narrow channels or over shallow seagrass beds in 0.5-4.6 m water depth. Hand captures were accomplished by jumping onto the target turtle from the boat.

Biometric and Non-biometric Data

Turtles were checked for evidence of previous tagging, e.g., living, flipper, and PIT (Passive Integrated Transponder) tags. Living tags appear as a white patch near the center of a carapace scute. Living tags are formed by transplanting a piece of lighter colored plastron tissue into a scute on the darker carapace at different scute locations to distinguish between year classes (Fontaine et al. 1993). This procedure was done on all headstarted Kemp's ridley turtles (captive reared for usually less than one year by the NMFS Headstart Program in Galveston, Texas) released since the 1984 year-class. Flipper tags are commonly placed on the trailing edge of the anterior flippers. If flipper tags were not present, inconel flipper tags (National Band and Tag Co., supplied by NMFS, Miami) were placed on the trailing proximal edge of both anterior flippers of all marine turtle species captured. If a PIT tag was not detected by scanning the anterior flippers and shoulder region then one was placed subcutaneously in the dorsal left anterior flipper of all Kemp's ridleys.

Measurements including carapace lengths and widths, plastron lengths, body depth, and weights were obtained for each individual. The carapace measurements included both curved and straight-line for the following: 1) standard carapace length (from the precentral scute at carapace midline to posterior margin of postcentrals, the straight-line measurement is included in this report (SSCL), 2) minimum carapace length, 3) notched carapace length, and 4) total carapace length. (See Pritchard et al. 1983 for full descriptions and diagrams of carapace measurements.) Both curved and straight-line plastron measurements were taken down the midline to the end of the midline and including the small scale, if present. In addition, the same measurements were taken to the posterior plastron bone. Curved tail measurements were obtained on the ventral side from the posterior margin of plastron to the vent and tip of tail and the same measurements were taken from the posterior plastron bone. Curved and straight-line carapace width was measured at the widest point of the dorsal side. Straight-line body depth was measured at the deepest point between the carapace and plastron. Tree calipers (either the 95 or 127 cm length) were used for all straight-line measurements and a 150 cm flexible tape measure was used for all curved measurements, all to the nearest mm). Turtles weighing under 40 kg were weighed to the nearest 0.2 or 0.5 kg using hanging Pesola spring scales and turtles over 40 kg were weighed to the nearest 1.0 kg using a platform spring dial scale. Photographs were taken of the full body of each individual and of deformities or mutilations.

Blood samples were taken, whenever possible, to determine sex of individuals. Blood samples were collected from the cervical sinus following procedures outlined by Owens and Ruiz (1980). Blood samples were chilled on ice until centrifuged for 30 min and the serum was then stored frozen until analyzed. Testosterone radioimmunoassays (RIA) were conducted to determine sex of individuals. RIAs were conducted at the lab of Dr. Dave Owens in the Department of Biology at Texas A&M University. Procedures used in this analysis are described by Valverde (1996).

Water depth, salinity, and water temperature were recorded when equipment was available. Water depth was measured to the nearest 0.05 m using 1" PVC tubing. In 1996, salinity and water temperatures were obtained at the time of capture using a YSI model 30 meter. Substrate data were also recorded whenever possible. Latitude and longitude were recorded at each capture location using a Trimble ScoutMaster with an accuracy to 25 meters.

Results

Captures

A total of 44 days (n = 22 in 1995 and n = 22 in 1996) were spent netting or searching for turtles. A total of 38 individuals (n = 5 in 1995 and n = 33 in 1996) were captured with one recapture for a total of 39 captures. This includes five Kemp's ridleys captured during 1995 in the vicinity of Apalachee Bay (Levy Bay and Fiddler's Point; see Campbell and Sulak (1996) for other sites netted) and 18 Kemp's ridleys captured primarily in the lower Big Bend area (near Fisherman's Rest and Pepperfish Keys) during 1996 (Figure 1). In 1996, two other species of marine turtles were captured, 11 green turtles (*Chelonia mydas*) and four loggerheads (*Caretta caretta*). The majority of Kemp's ridleys, and total individuals, were captured in the vicinity of Pepperfish Keys, 47.8 and 52.6 %, respectively. Nineteen turtles were captured using set nets, 17 using strike nets, and 3 were captured by hand (Figure 2). In 1996, 72.5 hours were spent using set nets and 13 individuals were captured for an overall capture rate of 0.18 turtles/set net hour (Table 1), an increase from 0.04 turtles/set net hour in 1995 (Campbell and Sulak 1996). Synoptic data on individuals by capture location are presented in Appendix I.

Kemp's ridleys

Kemp's ridleys ranged in size from 23.4 - 64.2 cm standard straight carapace length (anterior notch to posterior tip; SSCL) and weighed from 2.0 - 40.0 kg (Appendix I). Kemp's ridleys were on average the smallest of the three species captured ($\bar{x}$ = 38.3 cm SSCL, standard deviation (SD) = 10.8; Figure 3). SSCL was significantly correlated with water depth at capture location ($\bar{x}$ depth = 1.8 m, SD = 0.9, range = 0.8 - 4.6 m; r = 0.706, P = 0.003). Turtles were captured over either seagrass, sand, or sand/mud substrate. Set nets captured 52 % of the ridleys, although strike netting was also effective (39 %), Figure 2.

Four headstarted turtles were captured (n = 3 in 1995 and n = 13 in 1996). The remaining 19 ridleys were assumed to be wild because they showed no evidence of previous tagging. The headstart turtles were identified from either PIT, flipper or living tags. These turtles were from the 1986, 1991, 1992 and 1993 year classes and ranged from approximately 2 - 10 years of age (C. W. Caillouet pers. com.). The largest of the four headstarted turtles (and largest ridley we captured) is also the largest recaptured headstart Kemp's ridley to date (T. Fontaine pers. com.). This turtle was captured near Pepperfish Keys (during the nesting season at Rancho Nuevo, Mexico) and was of mature size (64.2 cm SSCL).

In 1996, using RIA, sex was determined for 12 of 14 Kemp's ridley blood samples. The sex ratio of these 12 animals was 1M:2F.

Green Turtles

Green turtles averaged slightly larger than Kemp's ridleys, although we captured them in the same areas ($\bar{x}$ = 44.9 cm, SD = 11.3, range = 30.1 - 70.7 cm; Figure 3). SSCL was not correlated with water depth at capture ($\bar{x}$ depth = 1.5 m, SD = 0.76, range = 0.8 - 3.65) as was found with Kemp's ridleys. The majority (63.6 %) of green turtles were captured using strike netting (Figure 2) and 90.1 % (n = 10) were captured over seagrass. The occurrence of green turtle fibropapillomatosis was 55 % (n = 6; see Appendix I). Blood samples were collected from 10 green turtles. Of these 10, sex was determined for eight animals using RIA. The sex ratio of these eight was 1M:7F.

Loggerheads

Loggerheads were the largest turtles we captured with all four exceeding the largest SSCL of the other two species ($\bar{x}$ = 85.0 cm, SD = 13.0, range = 70.8 - 96.3, not including one turtle at 99.3 cm curved carapace length; Figure 3). Loggerheads were generally captured in deeper water ($\bar{x}$ = 3.3 m, SD = 1.6, range = 1.5 - 4.5) than many of the greens and ridleys and 75 % were captured using set nets (Figure 2). However, the largest female (96.3 cm SSCL) was captured in water only 1.5 m in depth using a strike net. This same turtle was missing most of the right rear flipper and part of the right posterior shell.

One blood sample was collected for RIA analysis from the four loggerheads captured. External characteristics were used to determine the sex of two turtles and the third was not determined. The sex ratio for three of the four turtles was 1M:0.5F.

Discussion and Recommendations

The majority of marine turtles captured during this study in the Florida Big Bend area were wild juvenile Kemp's ridleys. Our data suggest that the shallow waters in this area are important summer developmental habitat for the species and that this area may figure prominently in attempted recovery of the highly endangered Kemp's ridley. We have identified two sites in the lower Big Bend, Pepperfish Keys and Fisherman's Rest, in which this species could consistently be located and sampled during summer months.

A few sites in the Apalachee and adjacent Bays (Fiddler's Point and Levy Bay) were also productive sites for capturing juvenile ridleys during this study. In addition, Rudloe et al. (1991) reported Levy Bay as a capture location for juvenile ridleys. We preliminarily recommend these four locations for long-term monitoring. Sampling efforts should also be conducted at additional sites to identify other capture locations for long-term monitoring in the Big Bend. Based on reports from local fisherman, we also recommend that future netting efforts in Apalachee Bay include the area near Live Oak Point, Elmour's Cove, Goose Creek Bay, and East Flats (Figure 1 inset). In addition to monitoring, future research efforts should include habitat use and movement patterns, particularly migrational movements in the nearshore coastal waters.

The range of carapace lengths of wild Kemp's ridleys captured in this study (23.4 -58.0 cm) is similar to the size range of turtles captured in Cedar Key, Florida (30 - 57 cm, Schmid and Ogren 1990) and in the Dickerson Bay/Levy Bay area (20.3 - 57.9 cm, Rudloe et al. 1991). Many of the headstart turtles we captured were larger (29.3 - 64.2 cm) than those reported by Rudloe et al. (24.1 - 29.7 cm, 1991). The largest ridley (64.2 cm SSCL) we captured was the only headstart turtle we captured at the southern most capture area while the remaining headstart ridleys (29.3 - 38.8 cm SSCL) were captured in the same area as those reported by Rudloe et al. (1991).

The capture of five headstarted Kemp's ridleys is of particular interest because little information is available on survival rates of headstarted turtles. Our results indicate that headstarted ridleys are using the same habitat as wild ridleys suggesting successful transition to life in the wild. Future sampling and monitoring efforts should reveal more valuable information on habitat use and survival of headstarted ridleys.

Sex ratios of wild Kemp's ridley are essentially unknown (Marquez M. 1994). However, some data are available for headstarted Kemp's ridleys (Wibbels et al. 1985). Unlike our data, these data show a sex ratio skewed towards males in most year classes studied (four out of six) (1978 = 1.9M:1F (n = 32), 1979 = 1.4M:1F (n = 22), 1981 = all females (n=4), 1982 = 2.9M:1F (n = 92), 1983 = 1:1 (n = 12), 1984 = 2.5M:1F (n = 159). Our results suggest that wild ridleys have a naturally skewed sex ratio towards females and that incubation temperatures for headstarted turtles are possibly low, causing a shift in the sex ratio towards males. However, our results are non-conclusive because of a small sample size. Additional data on sex ratios of wild ridleys are needed.

Set netting in channels used by ridleys was the most effective method of capture. However, strike netting over seagrass beds (and channels depending on channel depth) was also effective and would be improved considerably in effectiveness and efficiency with proper net length and mesh size. Although strike netting is somewhat limited to use in areas of high water clarity it may be superior to set netting under these conditions. We recommend a mesh size of 15 - 20 cm bar x 50 m for set netting and 10 - 15 cm bar x 120 m for strike netting.

The lower number of captures of green turtles (n = 11) compared to ridleys (n = 18) is probably less a reflection of their true abundance in the seagrass beds of the lower Big Bend, but rather the greater difficulty of capturing green turtles. This is probably due to their speed and agility and our inexperience with strike netting, which may be the most successful method to capture green turtles in this region. The high frequency (55 %) of fibropapilloma occurrence on green turtles in this region had not previously been reported and provides a preliminary indication of infection rates in this population. It is unknown if these green turtles are from the Florida rookery or other Caribbean rookeries (e.g., Yucatan, Mexico or Tortuguero, Costa Rica). The occurrence of this species in this region provides an opportunity to learn more about Caribbean green turtles in an area where little research has been conducted.

Our capture methods have been refined over the past two seasons (1995 & 1996) increasing the probability of greater catches in subsequent years. The objectives of the project to

date have been met with the exception of radio/acoustic tracking to investigate movement patterns. These first two seasons of work have provided base knowledge of spacial/seasonal occurrence of Kemp's ridleys within the Big Bend that now makes tracking more feasible. USGS-BRD anticipates using at least one automatic acoustic/radio listening post to monitor movements of telemetered ridleys along the coast. The initial listening post will be installed at the mouth of East Pass, Suwannee River in spring 1997.

In summary, the shallow seagrass flats and associated channels of the Florida Big Bend are used by at least three species of marine turtles. However, this area seems to be particularly important developmental habitat for the Kemp's ridley, the most endangered marine turtle. Continued monitoring and research efforts in this area are imperative to evaluating population trends and defining life history patterns of Kemp's ridleys in the Gulf of Mexico.

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Table 1. Capture rates of marine turtles captured in the Big Bend of Florida by capture location using set nets during 1996.

CAPTURE LOCATION	SET NET HOURS	# OF TURTLES CAPTURED	CAPTURE RATE (Turtles/hr)
Pepperfish Keys	34.8	6	0.17
Fisherman's Rest	29.3	6	0.20
Fiddler's Point	8.4	1	0.12
Total	72.5	13	0.18

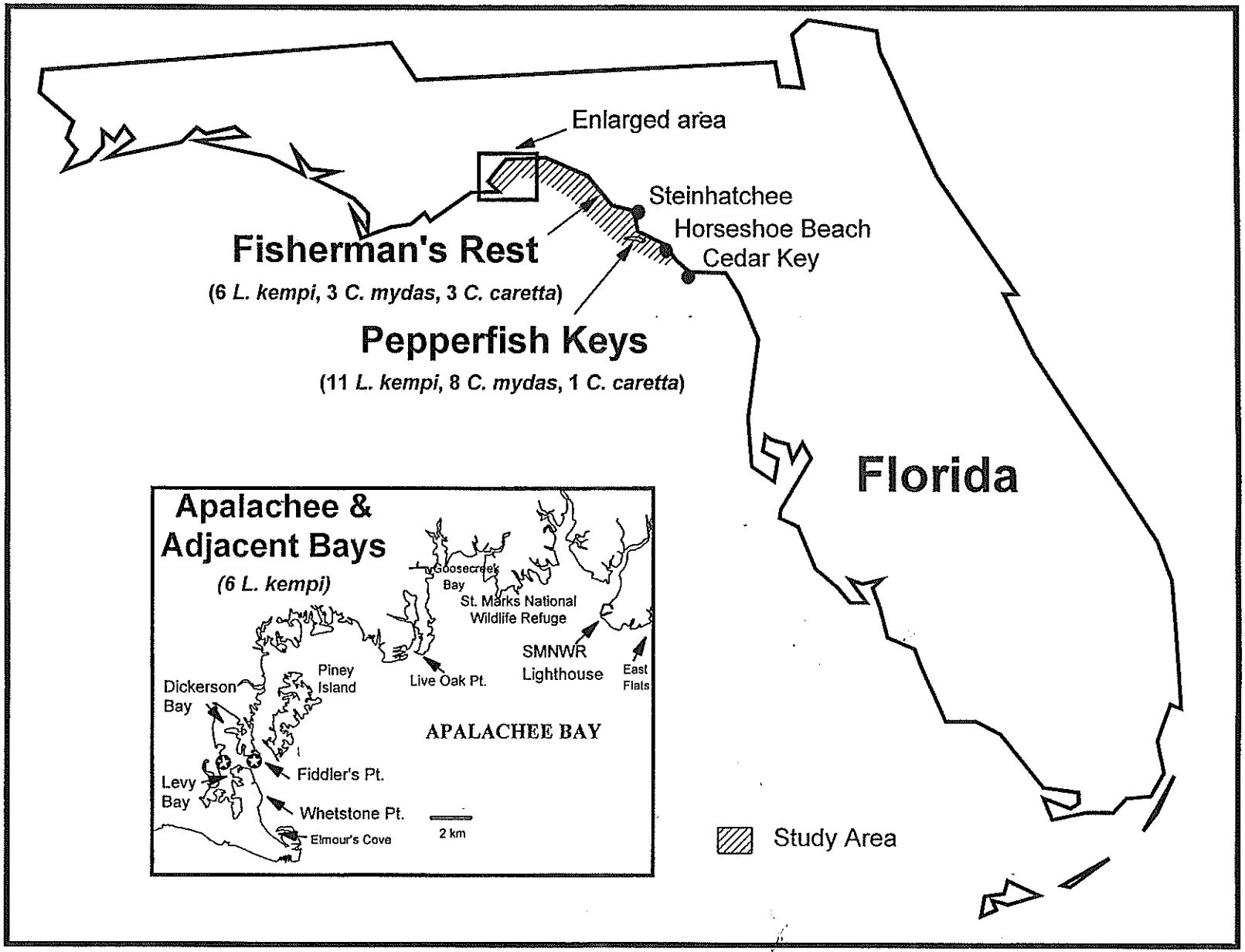

Figure 1. Map showing the three major sampling areas. A total of 23 *Lepidochelys kempi*, 11 *Chelonia mydas*, and 4 *Caretta caretta* were captured during the 1995 and 1996 seasons. In 1995 netting was conducted in the Apalachee Bay area, inset shows the five sampling sites: Levy Bay, Dickerson Bay, Fiddler's Point, Whetstone Point, and SMNWR Lighthouse (capture locations are indicated by ✪). In 1996 netting was conducted primarily in the vicinity of Pepperfish Keys and Fisherman's Rest.

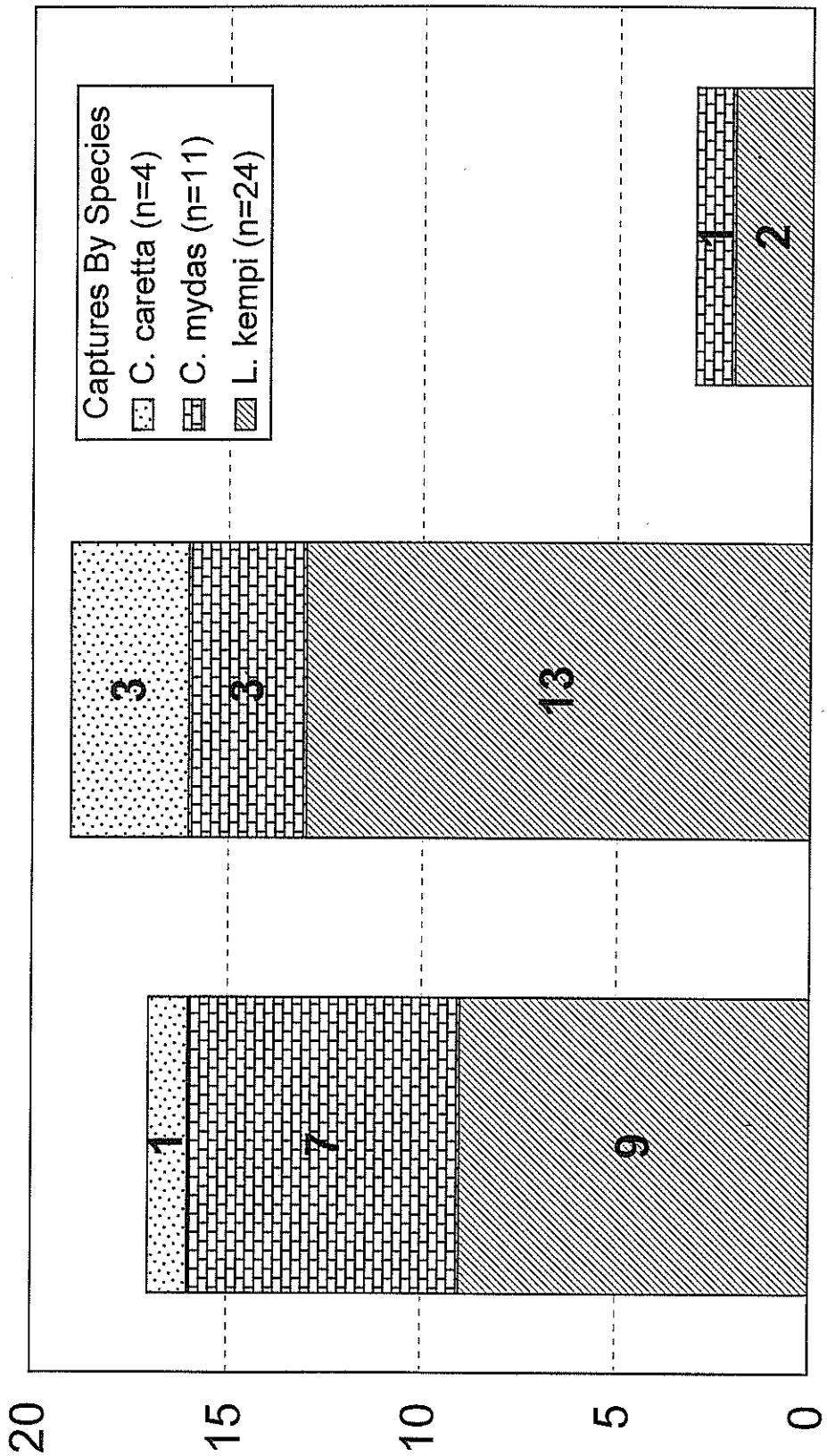

Figure 2. Number of turtle captures in the Florida Big Bend by species and capture method during 1995 and 1996 seasons.

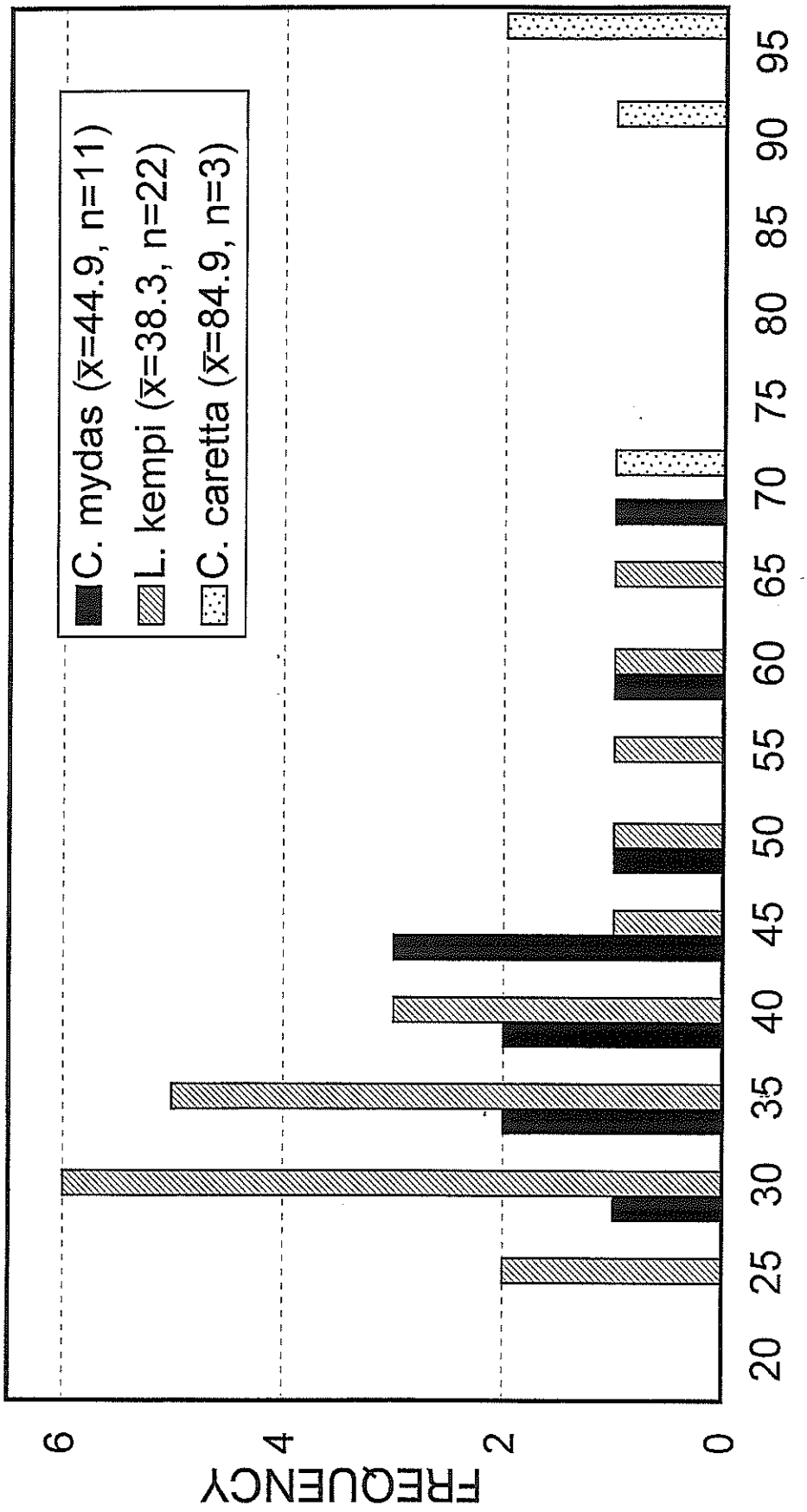

Figure 3. Standard straight carapace length (notch-to-tip) distribution by 5 cm midpoint increments of all species captured in the Florida Big Bend during 1995 and 1996 seasons. Note that only curved carapace length was measured for one *C. caretta* (99.3 cm) which was included in the 95 cm midpoint, but not included in the calculation of the mean.

APPENDIX I: Synoptic capture data for Kemp's ridley and other sea turtle species from NMFS/USGS-BRD sampling, FY 1995 & 1996.

SPECIES	TAG #'S RIGHT LEFT PIT	CAPTURE DATE	CAPTURE LOCATION (LATITUDE LONGITUDE)	CAPTURE METHOD	STANDARD STRAIGHT CARAPACE LENGTH (CM)	WEIGHT (KG)	COMMENTS
LK	NO TAGS	27 Jun 95	Levy Bay	Set Net	33.8 (max)	5.45	
LK	SSN801 SSN802 2242190B60	7 Sept 95 13 Sept 95	Fiddler's Pt.	Set Net	38.4	8.60	living tag on 2nd left costal scute, not PIT tag detected
LK	SSH019 SSN803 1F09221422	13 Sept 95	Fiddler's Pt.	Set Net	28.6	4.50	living tag on 3rd left costal scute, PIT tag present when captured
LK	SSN804 SSN805 2218256A1B	10 Oct 95	Levy Bay	Set Net	35.0	6.50	
LK	SSN806 SSN807 7F7D31127A	20 Oct 95	Fiddler's Pt.	Set Net	36.1	7.50	living tag on 3rd right costal scute, PIT tag present when captured
LK	SSN808 SSN809 2242253909	15 May 96	Pepperfish Keys	Strike Net	64.2	~40.0	living tag on 4th nueral scute & tag scar on rt. front flip.
CC	SSN810 SSN811	15 May 96	Pepperfish Keys	Set Net	99.3 (curved length)		
CM	SSN812 SSN813	29 May 96	Pepperfish Keys	Set Net	49.2	17.0	
LK	SSN814 SSN815 2240040900	29 May 96	Pepperfish Keys	Set Net	35.4	5.75	
CM	SSN816 SSN817	31 May 96	Pepperfish Keys	Set Net	57.6	26.5	many sm. papillomas on eyes, flippers and tail (< 3 cm)
LK	SSN818 SSN819 2242175E62	4 June 96	Fisherman's Rest N29°42.22' W83°32.18'	Set Net	31.2	4.5	
CC	SSN820 SSN821	4 June 96	Fisherman's Rest N29°42.22' W83°32.18'	Set Net	87.8	~105.0	
LK	SSN822 SSN823 22421E350A	4 June 96	Fisherman's Rest N29°42.22' W83°32.18'	Set Net	41.3	11.0	
LK	SSN824 SSN825 2242263308	4 June 96	Fisherman's Rest N29°42.22' W83°32.18'	Set Net	55.0	23.0	

APPENDIX I (CONTINUED)

SPECIES	TAG #'S RIGHT LEFT PIT	CAPTURE DATE	CAPTURE LOCATION (LATITUDE LONGITUDE)	CAPTURE METHOD	STANDARD STRAIGHT CARAPACE LENGTH (CM)	WEIGHT (KG)	COMMENTS
LK	SSN826 SSN827 223F7C5371	5 June 96	Fisherman's Rest	By Hand	44.3	11.5	upper rt. mandible mutilated
LK	SSN828 SSN829 22400B0740	7 June 96	S. Pepperfish Key N29°28.14' W83°20.59'	By Hand	33.6	5.5	approx. 1/3 of left front flipper missing
CM	SSN830 SSN831	7 June 96	S. Pepperfish Key N29°28.98' W83°22.98'	Strike Net	37.3	7.5	
CC	SSN832 SSN833	18 June 96	Fisherman's Rest	Strike Net	96.3	111.0	lg. mutilation of rt. posterior carapace and rear flipper
CC	SSN834 SSN835	18 June 96	Fisherman's Rest N29°42.22' W83°32.18'	Set Net	70.8	45.0	mutilation on 2nd scale of rt. front flipper - not a tag scar
LK	SSN836 SSN837 223D1A5622	26 June 96	S. Pepperfish Key N29°28.13' W83°19.93'	Strike Net	26.0	2.5	
LK	SSN838 SSN839 2242153972	26 June 96	S. Pepperfish Key N29°28.19' W83°19.93'	Strike Net	30.8	5.5	
LK	SSN840 SSN841 22193C6B73	26 June 96	S. Pepperfish Key N29°27.89' W83°19.93'	Strike Net	34.7	6.0	
LK	SSN842 SSN843 223D035B72	26 June 96	S. Pepperfish Key N29°27.89' W83°19.93'	Strike Net	23.4	2.0	
LK	SSN844 SSN845 224239681A	5 Aug 96	S. Pepperfish Key N29°28.85' W83°22.46'	Strike Net	30.9	4.4	
CM	SSN846 SSN847	6 Aug 96	Fisherman's Rest N29°44.17' W83°34.96'	By Hand	70.7	48.5	many sm. papillomas on ventral side of flippers (< 1 cm)
LK	SSN848 SSN849 224229235E	21 Aug 96	Fiddler's Point N30°00.86' W84°22.00'	Set Net	32.2	5.0	
LK	SSN850 SSN851 2242311D70	1 Sept 96	Pepperfish Keys N29°30.82' W83°25.46'	Set Net	50.8	17.25	fine scars on both sides of neck (5.0 cm on left & 4.5 cm on right)

APPENDIX I (CONTINUED)

SPECIES	TAG #'S RIGHT LEFT PIT	CAPTURE DATE	CAPTURE LOCATION (LATITUDE LONGITUDE)	CAPTURE METHOD	STANDARD STRAIGHT CARAPACE LENGTH (CM)	WEIGHT (KG)	COMMENTS
LK	SSN852 SSN853 223C7F7708	1 Sept 96	Pepperfish Keys N29°30.82' W83°25.46'	Set Net	42.1	11.0	
LK	SSN854 SSN855 2219305961	7 Sept 96	Fisherman's Rest N29°42.51' W83°32.18'	Strike Net	47.6	15.2	
LK	SSN856 SSN857 2242271626	7 Sept 96	Fisherman's Rest N29°42.24' W83°32.02'	Strike Net	32.0	4.4	deformed or mutilated tip of upper mandible
CM	SSN858 SSN859	7 Sept 96	Fisherman's Rest N29°42.52' W83°32.14'	Set Net	44.2	10.8	4 papillomas, inc. 1 lg. at ventral base of rt. rear flipper (5.48x4.32 cm)
CM	SSN860 SSN861	7 Sept 96	Fisherman's Rest N29°42.27' W83°35.02'	Strike Net	43.0	10.8	> 20 papillomas, inc. 1 lg. at inguinal of left rear flipper (13.4x13.1 cm)
LK	SSN862 SSN863 22421C5600	8 Sept 96	Pepperfish Keys N29°30.75' W83°25.45'	Strike Net	58.0	25.4	
CM	SSN864 SSN865	15 Sept 96	Pepperfish Keys N29°29.22' W83°23.81'	Strike Net	38.0	6.8	
CM	SSN866 SSN867	15 Sept 96	Pepperfish Keys N29°31.72' W83°25.02'	Strike Net	42.0	10.6	papilloma on rt. eye (~0.6x0.7 cm)
CM	SSN868 SSN869	15 Sept 96	Pepperfish Keys N29°30.34' W83°24.09'	Strike Net	30.1	3.5	
CM	SSN870 SSN871	23 Sept 96	Pepperfish Keys N29°32.95' W83°24.59'	Strike Net	46.7	12.1	3 papillomas
CM	SSN872 SSN873	24 Sept 96	Pepperfish Keys N29°30.78' W83°24.01'	Strike Net	35.0	6.0	possible tag scar on rt. front flipper, mutilations on both rear flippers

LK = *Lepidochelys kempi*, CM = *Chelonia mydas*, CC = *Caretta caretta*